

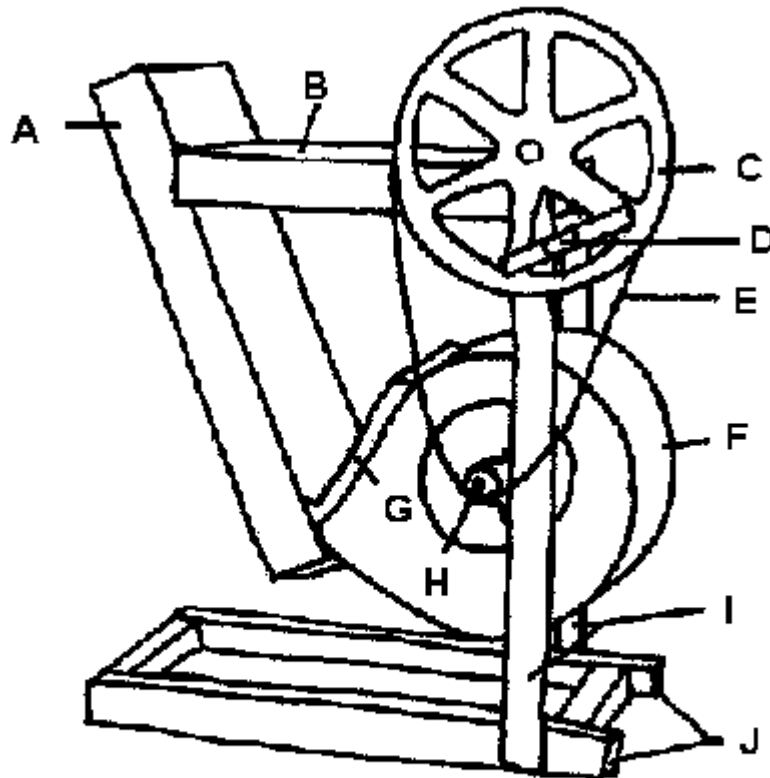
Hand Operated Winnower

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0 5 10 15 20 Scale, inches

- A Rectangular sheet metal air duct, 24 inch long x 10 inch wide x 3-½ inch deep, available from heating and ventilation supply houses.
- B Sheet metal tray, make your own.
- C Sheave (V- belt pulley), 14-inch diameter, available from WW Grainger (3X943 or 3X942) (1-800-323-0620).
- D Crank handle, make your own.
- E V-belt.
- F Blower with 9-½ inch diameter wheel (4C589) or larger, available form WW Grainger.
- G Sheet metal cover and adapter to merger blower (F) with air duct (A).
- H Sheave, ½ inch bore, 1 ½ diameter and a pillow block, ½ inch diameter bore
- I 1 x 2 inch steel channel or 2 x 4 inch wood upright support.
- J 1 x 2 inch steel channel or 2 x 4 inch wood base for winnower.

Operation:

The winnower separates seeds from chaff by blowing the less dense chaff away as seeds fall down a column of air. Place the seed and chaff mixture on the tray (B). Turn the crank handle (D) and push the seed mixture into the air duct (A). Manually adjust the crank speed to provide enough airflow to lift the lighter chaff up and out the top of the air duct, while allowing the denser seeds fall through the bottom of the air duct.

Construction (brief description):

The air duct (A) is purchased from a hardware store. Cut a 2 x 9 inch slot across the air duct, 6 inches from the end. This slot receives the tray (B), and allows seed and chaff on the tray to be introduced into the air duct (A). The tray (B) is made from a 16 x 24 inch, 20-gauge sheet metal. Fold 3 sides up 3 inches and fold the fourth side down 1 inch to make a 10 x 20 inch tray. Trim the fourth side $\frac{1}{2}$ inch from both ends leaving a 9-inch lip that inserts and hooks on to the 2 x 9 inch slot in the air duct (A).

Attach the upright supports (I) to the blower (F) with the blower tilted up 22 degrees, 6 inches off the ground and the axle of the blower wheel is centered on the pillow block/sheave (H). Make base (J). Attach supports (I) to base (J). If supports (I) and base (J) are made from 2 x 4 wood, add diagonal braces (not shown) to strengthen the join. No additional brace is needed if the upright supports (I) and base (J) are 2 inch steel channels welded together. A spacer is attached across the top of the two upright supports (I), (not visible in diagram). The spacer provides bottom support for the tray (B). The 14-inch sheave mounts on to the upright support using a rigid pillow block or two self-aligning pillow blocks, one on each side of the upright support.

Make a sheet metal cover and adapter (G) to merge blower (F) with air duct (A) at 45-degree angle between blower and air duct. A 45-degree air duct elbow can be used as part of the adapter. The sheet metal cover (G) allows a 1- $\frac{1}{2}$ inch gap at the bottom of the blower (F) for air to discharge into the air duct (A). Place a $\frac{1}{4}$ inch mesh screen (not visible in diagram) across the 1- $\frac{1}{2}$ inch gap to prevent debris from entering into the blower.